

## b) $B_s$ fraction enhancement

Dipole Tag very inclusive

add low efficiency / high  $B_s$  fraction Tag

possible candidates:

- kaons from D, fragm. kaons
- kaon / lepton correlation
- $\phi$ 's from D

⋮

motivation:

a) high  $B_s$  fraction sample to  
test Dipole Tag

b) improve Mixing Sensitivity -

What are we shooting for?

example:

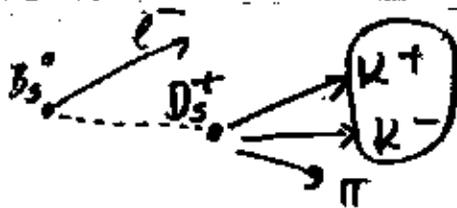
10% sample,  $B_s$  fraction  $f_{B_s} = 40\%$   
(nominal:  $f_{B_s} = 18\%$ )

$$S = \sqrt{N} f_{B_s} (1 - 2\alpha)$$

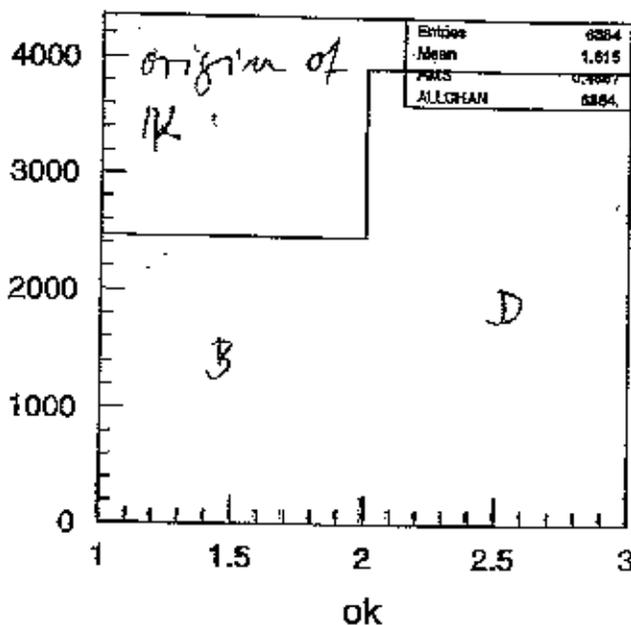
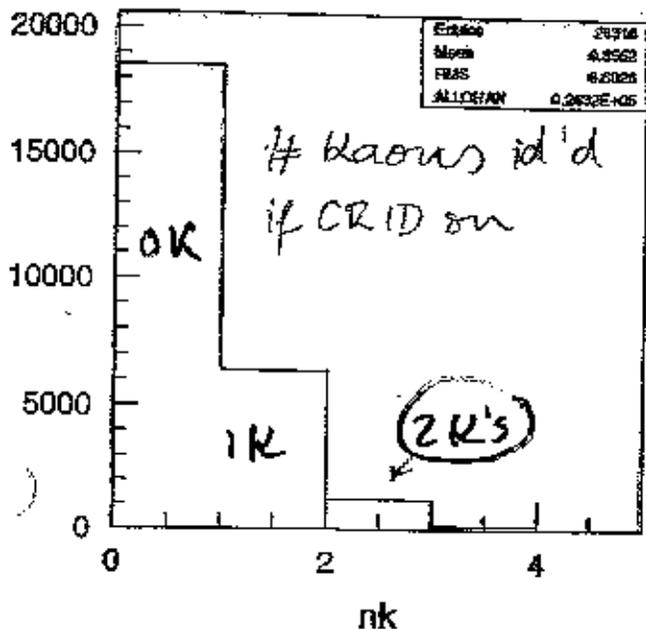
$$S_{\text{new}} = \sqrt{S_1^2 + S_2^2} = \sqrt{.9 \cdot .156^2 + .1 \cdot .4^2} \Rightarrow \text{8\% improvement}$$

# a) double kaon events

idea:

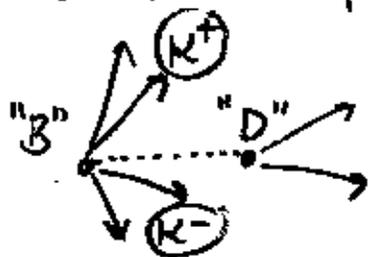


PDGs:  $\sim 10-15\%$   
 suppresses  $D^\pm(B^0)$



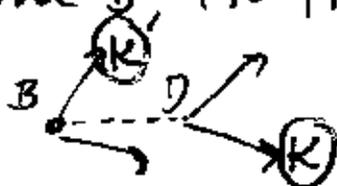
if CRID on: 2 id'd kaons:  $\epsilon = 5\%$   $f_{B_s} = 25\%$   
 $\Rightarrow$  of those:

1) 2K reconstructed from B vertex (20%):



$f(B_s) = 30\%$   
 DD-tag!  $f(DD) = 50\%$  (nominal: 20%)

2) 1K from B, 1K from D (50%):



$f(B_s) = 16\%$   
 $f(DD) = 34\%$

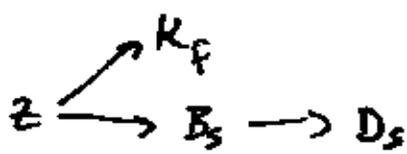
veto?

3) 2 kaons from D vertex (30%)

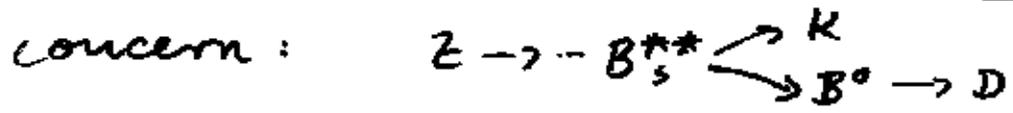
$f(B_s) = 36\%$   $\epsilon = 2\%$   
 $f(DD) = 30\%$

b) fragmentation kaons

idea:



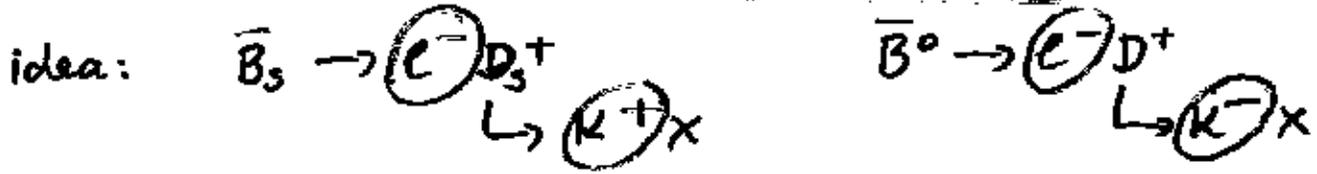
MC: (if CRID on:)  $\epsilon = 13\%$   $f_{B_s} = 33\%$



not in MC.

quick MC / Data comparison: ~ same # frag. K

2) kaon / lepton correlation



•  $\geq 1$  kaon, lepton from B,  $Q_K \cdot Q_L < 0$

$\epsilon = 2\%$   $f(B_s) = 30\%$

(will suffer from lept. + D analysis)

• 2 K from D, 1 L fr. B

$\epsilon = 0.4\%$   $f(B_s) = 60\%$

d)  $\phi$  candidates



combine pairs of opp. charged tracks  
in tertiary vertex

$$\underline{\epsilon = 12\%}$$

$$\underline{f(B_s) = 26\%}$$

if CRID on:  $\geq 1K$  from D

$$\underline{\epsilon = 3\%}$$

$$\underline{f(B_s) = 30\%}$$

e) multiplicity:

e.g. 1 prong B decays  $\epsilon = 48\%$   $f_{B_s} = 20\%$

How to combine these tags

$\rightarrow$  large overlap  $\phi, 2K, 4K \dots$

$\rightarrow$  Neural Net

8 input parameters: above + B, D-Mom

$\rightarrow$  implemented & running

but I don't understand output yet.